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THE
ASSURANCE MAGAZINE,
AND
JOURNAL
OF THE
INSTITUTE OF ACTUARIES.

On the Expectation of Life. By CHARLES M. WILlich, Esq.,
Actuary to the University Life Assurance Society.

[Read before Section F. (Economic Science and Statistics), at the Meeting of
the British Association for the Advancement of Science, 1857.]

NO law has hitherto been discovered, by which a correct table of mortality could be constructed, but attempts have been made by De Moivre and others to obtain an approximation.

If, in conformity with the opinion now generally entertained, and in which I concur, we adopt the Carlisle Table of Mortality, as formed by Milne from the observations made by Dr. Heysham, as a nearer approximation to the actual duration of human life than any other table of mortality hitherto in use, it is remarkable that the following simple hypothesis should enable us to obtain the *expectation of life* almost identical with Milne's table for a long series of years up to the age of 60.

Let a = the age, then $\frac{2(81\frac{1}{2}-a)}{3}$ = expectation.

We may fairly consider those individuals who attain the age of 60 as selected lives, who may be expected to range within a higher limit than those whom we found existing at the age of 5. Therefore I venture to assume that the respective groups of lives existing at the ages of 5, 60, and 74, fall under different laws.

The following expressions will give the expectation of life, closely approximating to the results as calculated by Milne.

From the age of 5 to 60—

$$\frac{2}{3} \text{ of the difference between the age and } 81\frac{1}{2} = \text{expectation;}$$

$$\text{or, } \frac{2(81\frac{1}{2} - a)}{3} = \text{expectation.}$$

From the age of 60 to 74—

$$\frac{1}{2} \text{ of the difference between the age and } 88\frac{2}{3} = \text{expectation;}$$

$$\text{or, } \frac{88\frac{2}{3} - a}{2} = \text{expectation.}$$

From the age of 74 to 90—

$$\frac{1}{4} \text{ of the difference between the age and } 103 = \text{expectation;}$$

$$\text{or, } \frac{103 - a}{4} = \text{expectation.}$$

Table showing the Expectation of Life.

Age.	By Carlisle Table of Mortality.	By the proposed Hypotheses.	Age.	By Carlisle Table of Mortality.	By the proposed Hypotheses.
	Years. Parts.	Years. Parts.		Years. Parts.	Years. Parts.
5	51·25	51·00	38	28·96	29·00
6	51·17.	50·33	39	28·28	28·33
7	50·80	49·66	40	27·61	27·66
8	50·24	49·00	41	26·97	27·00
9	49·57	48·33	42	26·34	26·33
10	48·82	47·66	43	25·71	25·66
11	48·04	47·00	44	25·09	25·00
12	47·27	46·33	45	24·46	24·33
13	46·51	45·66	46	23·82	23·66
14	45·75	45·00	47	23·17	23·00
15	45·00	44·33	48	22·50	22·33
16	44·27	43·66	49	21·81	21·66
17	43·57	43·00	50	21·11	21·00
18	42·87	42·33	51	20·39	20·33
19	42·17	41·66	52	19·68	19·66
20	41·46	41·00	53	18·97	19·00
21	40·75	40·33	54	18·28	18·33
22	40·04	39·66	55	17·58	17·66
23	39·31	39·00	56	16·89	17·00
24	38·59	38·33	57	16·21	16·33
25	37·86	37·66	58	15·55	15·66
26	37·14	37·00	59	14·92	15·00
27	36·41	36·33	60	14·34	14·33
28	35·69	35·66	61	13·82	13·83
29	35·00	35·00	62	13·31	13·33
30	34·34	34·33	63	12·81	12·83
31	33·68	33·66	64	12·30	12·33
32	33·03	33·00	65	11·79	11·83
33	32·36	32·33	66	11·27	11·33
34	31·68	31·66	67	10·75	10·83
35	31·00	31·00	68	10·23	10·33
36	30·32	30·33	69	9·70	9·83
37	29·64	29·66	70	9·18	9·33

Table showing the Expectation of Life (continued).

Age.	By Carlisle Table of Mortality.	By the proposed Hypotheses.	Age.	By Carlisle Table of Mortality.	By the proposed Hypotheses.
	Years. Parts.	Years. Parts.		Years. Parts.	Years. Parts.
71	8·65	8·83	81	5·21	5·50
72	8·16	8·33	82	4·93	5·25
73	7·72	7·83	83	4·63	5·00
74	7·33	7·33	84	4·39	4·75
75	7·01	7·00	85	4·12	4·50
76	6·69	6·75	86	3·90	4·25
77	6·40	6·50	87	3·71	4·00
78	6·12	6·25	88	3·59	3·75
79	5·80	6·00	89	3·47	3·50
80	5·51	5·75	90	3·28	3·25

On a Method of Testing the Solvency of an Assurance Company, with some considerations respecting the Terms upon which a Society's Business may be Purchased. By SAMUEL YOUNGER, of the Engineers' Life Office.

IT appears to be an admitted principle in the commercial world, that great evils have a tendency to work their own cure. Over-trading will bring about a state of things by which eventually it must be checked, and excessive speculation has its limit by the same invariable law.

More than two years ago, it was quite evident that the rapid manner in which new Companies were being formed for the purpose of assuring lives would ere long produce sad and humiliating results. Such an undue multiplication of Offices would of necessity render business for any one of them the more difficult to be secured; and therefore, if obtained, it could but be at a correspondingly larger cost. Competition in this respect has, indeed, been carried to so great an extent, that many of the new Offices have been brought to a complete stand; the mainspring of ultimate success—namely, the investment of a certain proportion of the premiums received—was of necessity broken; and to get business, however evanescent its character might prove to be, not only has it often happened that the whole of the premiums have been expended, but in some instances all the share capital too, and the Office has run largely into debt besides. At such a crisis, the expedient of amalgamating with another Company, or of selling